REMARKS

The present patent application now comprises fifty-one (51) claims, numbered 1 to 15, 17 to 37, 39, 40, 44, 45, 49, 50, 53 to 55, 57, 58, 60, 61, 63 and 64.

Claims 4, 5, 10 to 14, 23 to 27, 35 and 36 have been previously withdrawn. Claims 16, 38, 41 to 43, 46 to 48, 51, 52, 56, 59 and 62 have been previously cancelled.

Claims 1, 22, 32, 58, 61 and 64 have been amended. Support for these amendments may be found, *inter alia*, at: page 16, lines 3 to 6; page 18, lines 7 to 17; page 23, line 18 to page 24, line 22; Figure 8B; and Figure 11 of the specification and drawings as originally filed.

No new matter has been added to the present patent application by the present response.

1. Rejection of Claims 58, 61 and 64 under 35 USC 112

On page 2 of the Office Action, the Examiner rejects claims 58, 61 and 64 under 35 USC 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner considers that the specification does not describe the claimed feature specifying that "a ratio of the number of laser wavelengths to the length of [the] gain medium is at least 1 laser wavelength per cm of length of [the] gain medium".

To support her position, the Examiner contends that "[t]he specification and Fig 11 disclose the Er-Yb doped fiber to be 8 cm long, while the actual gain medium defined by the superstructure grating is only 2 cm long". With all due respect, the Examiner is incorrect. Specifically, the Examiner will note that the claims specify that the gain medium comprises rare-earth doped fiber having a superstructure grating, but in no way specify that the gain medium is "defined" by the superstructure grating as the Examiner contends. Indeed, for a given fiber laser, the gain medium, i.e., the active fiber, is typically longer than a grating thereon and thus the length of the gain medium is not just the length of the grating. In the example referred to by the Examiner, the gain medium comprises the Er-Yb doped fiber having a length of 8 cm and thus has a length of 8 cm (page 23, line 18 to page 24, line 22).

The Examiner also states that "[t]he ratio of the number of wavelength [*sic*] to the length of the fiber therefore is equal to 1 (8/8=1 or 15/8=1.8), not greater than or equal to 1 [and that this] number is specific data points [*sic*] and cannot be described as open ended ranges ("at least 1"), since there is no evidence to indicate that the ratio can be any other number besides 1 and 1.8".

Each of claims 58, 61 and 64 has been amended to recite that the ratio of the number of laser wavelengths to the length of the gain medium is at least 1.0 laser wavelength per cm of length of the gain medium. The two values of 1.0 (i.e., 8/8) and 1.875 (i.e., 15/8) for the ratio that are described in the example on page 23, line 18 to page 24, line 22 of the Applicants' patent application clearly show that the Applicants had possession of the invention that allowed them to achieve the ratio of at least 1.0 laser wavelength per cm of length of gain medium recited in the claims (i.e., 1.0 and 1.875 are respectively equal to and greater than 1.0). When considering the Applicants' patent application, an ordinarily skilled person would be able to obtain other values for this ratio by varying parameters of the laser such as the length of the fiber, the length of the gratings and/or the gratings' chirp in cases where chirped gratings are used. Therefore, the Applicants have described in their patent application a practical implementation demonstrating two values (i.e., 1.0 and 1.875) amongst various possible values that may be achieved by an ordinarily skilled person, and as such have properly supported the ratio of at least 1.0 laser wavelength per cm of length of gain medium recited in the claims.

Accordingly, claims 58, 61 and 64 fully comply with the written description requirement of 35 USC 112, first paragraph, and the Examiner is therefore respectfully requested to withdraw the rejection of these claims.

1. Rejection of Claims 1 to 3, 6 to 9, 15, 17 to 22, 28 to 34, 37, 39, 40, 44, 45, 49, 50, 53 to 55 and 60 and 63 under 35 USC 103

On pages 3 to 6 of the Office Action, the Examiner rejects claims 1 to 3, 6 to 9, 15, 17 to 22, 28 to 34, 37, 50, 60 and 63 under 35 USC 103(a) as being unpatentable over "Robust high

power (> 20 mW) all-fibre DFB lasers with unidirectional and truly single polarization outputs" by Ibsen *et al.* (hereinafter referred to as "REF1") in view of "Dual wavelength modelocked fiber laser" by Town *et al.* (hereinafter referred to as "REF2") and "Wide-band Fabry-Perot-like filters in optical fiber" by Town *et al.* (hereinafter referred to as "REF3"). In addition, on pages 5 and 6 of the Office Action, the Examiner rejects claims 39, 40, 44, 45, 49, 50 and 53 to 55 under 35 USC 103(a) as being unpatentable over REF1 and REF2.

As discussed below, the Applicants respectfully submit that claims 1 to 3, 6 to 9, 15, 17 to 22, 28 to 34, 37, 39, 40, 44, 45, 49, 50, 53 to 55, 60 and 63 are allowable over REF1, REF2 and REF3 and respectfully request the Examiner to withdraw the rejection of these claims.

Claims 1, 22 and 32 are reproduced below with certain elements being emphasized:

1. A multi-wavelength laser source comprising:
   a) an input for receiving an energy signal;
   b) a gain section in communication with said input, said gain section including a homogeneously broadened gain medium comprising rare-earth doped fiber having a superstructure grating, said superstructure grating forming a plurality of cavities that are distributed in said homogeneously broadened gain medium such that, when the energy signal is applied to said gain section, **different resonant wavelengths resonate in respective ones of said cavities that are separated from one another**, said gain section generating a multi-wavelength laser signal when the energy signal is applied to the gain section; and
   c) an output for emitting the multi-wavelength laser signal.

22. A method suitable for generating a multi-wavelength laser signal, said method comprising:
   a) receiving an energy signal;
   b) providing a gain section including a homogeneously broadened gain medium comprising rare-earth doped fiber having a superstructure grating, said superstructure grating forming a plurality of cavities that are distributed in said homogeneously broadened gain medium such that, when the energy signal is applied to said gain section, **different resonant wavelengths resonate in respective ones of said cavities that are separated from one another**; and
   c) applying the energy signal to said gain section to generate a multi-wavelength laser signal..

32. A multi-wavelength laser source comprising:
   a) a pump laser unit adapted for generating an energy signal;
   b) a gain section including a homogeneously broadened gain medium comprising rare-earth doped fiber having a superstructure grating, said superstructure grating forming a plurality of cavities that are distributed in said homogeneously

broadened gain medium such that, when the energy signal is applied to said gain section, **different resonant wavelengths resonate in respective ones of said cavities that are separated from one another**, the pump laser unit being adapted for applying the energy signal to said gain section to cause a multi-wavelength laser signal to be generated; and

c) an output for emitting the multi-wavelength laser signal.

It is respectfully submitted that REF1, REF2 and REF3 neither teach nor suggest a homogeneously broadened gain medium comprising rare-earth doped fiber having a superstructure grating which forms a plurality of cavities that are distributed in the gain medium such that, when an energy signal is applied, **different resonant wavelengths resonate in respective ones of the cavities that are separated from one another.**

REF1 describes a distributed feedback (DFB) fibre laser in which a discrete phase-shift is introduced between two parts of a grating. Specifically, one part of the grating is phase-shifted by half a grating period relative to the other part (page 245, paragraph 2, lines 1 to 10 and page 246, paragraph 2, lines 11 and 12). This results in a portion of the fibre between the two parts of the grating in which any resonating wavelength has to resonate. In other words, any cavity in REF1's fibre laser overlaps with any other cavity that may exist therein. The Examiner even concedes that REF1 does not disclose cavities that are separated from one another. Therefore, REF1 cannot possibly be held to teach or suggest a plurality of cavities that are distributed such that different resonant wavelengths resonate in respective ones of the cavities that are separated from one another.

Now, REF2 describes a dual wavelength modelocked fiber laser which temporally spreads pulses at different wavelengths before amplification such that the pulses do not go through its gain medium at the same time, thereby reducing cross-gain saturation in its gain medium (page 1459, paragraphs 3 and 4). REF2's fiber laser has a "Bragg comb filter, fabricated by overwriting two chirped gratings", as described in REF3 (page 1459, paragraph 5, lines 10 to 12). As can be observed, REF3 describes a *passive* Fabry-Perot filter in which any two resonating modes resonate in two overlapping cavities. This is clearly shown in Fig. 1 and described on page 78, paragraph 4, lines 1 to 12 and page 79, paragraph 2, lines 3 to 6 (noting that each chirped grating has a length of 4 mm and is displaced by 8 mm from the other

chirped grating), where any two resonating modes have a strong overlap of their cavity in the portion of the fiber between the two chirped gratings.

Therefore, any two cavities in the comb filter of REF2's gain medium overlap and result in two wavelengths resonating and competing in a common portion of the gain medium. In fact, in order to reduce cross-gain competition due to this strong overlap between any two cavities in its comb filter, the very purpose of REF2's fiber laser is to pass pulses at different wavelengths at *different times* through its gain medium (page 1459, paragraphs 3 and 4). As such, REF2 (aided by REF3) in no way teaches or suggests a plurality of cavities that are distributed such that different resonant wavelengths resonate in respective ones of the cavities that are separated from one another.

It is thus apparent that REF1, REF2 and REF3, taken separately or in combination, fail to teach or suggest a plurality of cavities that are distributed such that different resonant wavelengths resonate in respective ones of the cavities that are separated from one another. As such, REF1, REF2 and REF3 fail to teach or suggest at least one feature of each of claims 1, 22 and 32. It is respectfully submitted that this shortcoming of the cited references precludes a finding of obviousness in respect of claims 1, 22 and 32.

Moreover, as REF1 and REF2 both teach a fiber laser in which any two cavities overlap, REF1 and REF2 *teach away* from the claimed invention, thereby further precluding a finding of obviousness in respect of claims 1, 22 and 32.

In view of the above, the Examiner is respectfully requested to withdraw the rejection of claims 1, 22 and 32, which are believed to be allowable.

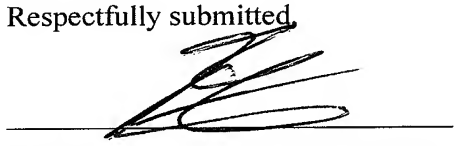
Each of dependent claims 2, 3, 6 to 9, 15, 17 to 21, 28 to 31, 33, 34, 37, 39, 40, 44, 45, 49, 50, 53 to 55, 60 and 63 depends on one of claims 1, 22 and 32 and thus incorporates by reference all the features of its base claim. As such, the Examiner is respectfully requested to withdraw the rejection of these dependent claims, which are believed to be allowable.

CONCLUSION

Claims 1 to 3, 6 to 9, 15, 17 to 22, 28 to 34, 37, 39, 40, 44, 45, 49, 50, 53 to 55, 57, 58, 60, 61, 63 and 64 are believed to be allowable. Favorable reconsideration is requested. In addition, rejoinder of withdrawn claims 4, 5, 10 to 14, 35 and 36, which are also believed to be allowable, is respectfully requested upon allowance of the generic claims presently in the application. Allowance of the application is earnestly solicited.

If the claims of the application are not considered to be in full condition for allowance, for any reason, the Applicants respectfully request the constructive assistance and suggestions of the Examiner in drafting one or more acceptable claims pursuant to MPEP 707.07(j) or in making constructive suggestions pursuant to MPEP 706.03 so that the application can be placed in allowable condition as soon as possible and without the need for further proceedings.

Respectfully submitted,



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